CG Schmidt has completed the review of the Preliminary Geotechnical Exploration Report compiled by CGC on July 17, 2023, and outlines the preliminary subsurface exploration program for the proposed 70-acre Monroe High School site. CGC is a professional geotechnical engineering and testing firm based in Madison that was engaged early in the process to ensure soil viability. The purpose of this preliminary exploration program was to obtain an initial understanding of the subsurface conditions across the site, and to provide preliminary geotechnical recommendations regarding site preparation, utility infrastructure, pavement, and foundation design and construction. It was confirmed that the subsurface conditions for this study were explored by excavating five (5) test pits across the proposed campus.

The engineering report preliminarily verifies that the site is generally suitable for the planned development. To plan for this, CG Schmidt has included a contingency in the total project budget to cover and address the soil and site requirements.

If you have any additional questions, please refer to the Preliminary Geotechnical Exploration Report posted on the website.

Todd Krcma
Chief Estimator

CGSchmidt
433 West Washington Ave.
Madison, WI 53703

CGC, Inc.
Construction • Geotechnical
Consulting Engineering/Testing

July 17, 2023
C23315

Mr. Rodney Figueroa
Superintendent
Monroe School District
925 16th Ave, #3
Monroe, WI 53566

Re: Preliminary Geotechnical Exploration Report
Proposed Monroe High School
31st Avenue
Monroe, Wisconsin

Dear Mr. Figueroa:

Construction • Geotechnical Consultants, Inc. (CGC) has completed its preliminary subsurface exploration program for the above-referenced project. The purpose of this preliminary exploration program was obtain an initial understanding of the subsurface conditions across the project area and to provide preliminary geotechnical recommendations regarding site preparation, utility, pavement, and foundation design/construction. We are sending you an electronic copy of this report and can provide a paper copy upon request. An electronic copy is also being sent to the project teams at Fehr Graham and CG Schmidt.

PROJECT AND SITE DESCRIPTIONS

We understand that an approximately 70-acre site, encompassing multiple contiguous parcels, located east of 31st Avenue and generally southwest of WI-11, in Monroe, Wisconsin is being considered for the development of the new Monroe High School campus. The project site is currently farmland and is bounded by a commercial property to the south, as well as residential properties to the west and northwest, and additional farmland to the north and southeast.

Based on the provided preliminary conceptual site plan, the site is rolling and existing topography generally slopes from the northern and western portions of the property down towards the south and east at elevations ranging between about EL 1100 and 1010 ft.

It is important to note that the high school development is in the very early planning stages. As a result, limited design details were available at the time of this evaluation. However, we understand the high school campus is envisioned to include a two-story, slab-on-grade high school, new sports courts and fields, parking lots and driveways, and associated utilities. Based on the provided preliminary conceptual plan, the finished floor elevation of the new high school is planned at EL 1075 ft. No additional site grading information was available at the time of this report; however, based on the existing site topography, we anticipate that fairly significant cutting/filling will be required across the site to create planned building, pavement, sports courts/fields and site grades.

2921 Perry Street, Madison WI 53713
Telephone: 608/288-4100
FAX: 608/288-7887

SUBSURFACE CONDITIONS

Subsurface conditions for this study were explored by excavating five (5) test pits across the proposed campus at locations staked by Fehr Graham personnel, who also surveyed the ground surface elevations at the test pit locations. The number and location of the test pits performed were determined by Fehr Graham personnel, in conjunction with CG Schmidt. The test pits were excavated to depths varying from 8 to 15 ft below current site grades by Maddrell Excavating on July 12, 2023, using a Kobelco SK 330 excavator, and were logged in the field by CGC. The test pit locations are shown in plan on the Test Pit Location Exhibit presented in Appendix A.

The subsurface profiles at the test pit locations varied slightly across the site, but the following strata were generally encountered (in descending order):

- About 13 to 24 in. of ***topsoil***; followed by
- Approximately 4.5 to 14 ft of stiff to hard ***lean clay, lean to fat clay, and fat clay*** strata, as well as ***silt*** strata, with somewhat varying sand and gravel contents. In test pits TP-1, and 4, these soils were followed by
- Apparent weathered bedrock, consisting of ***sand*** with significant silt, gravel, and cobble contents, extending to the maximum excavation depths.

As an exception to the above-generalized profile, the *fat clay* soils encountered in TP-3, and 4, were characterized as *probable highly weathered bedrock* based on the presence of increasing gravel (chert) and cobbles with depth. Excavator refusal on apparent, harder bedrock was encountered within TP-1 and 4, but not in the remaining test pits.

Some of the native clays exhibit moderate to high plasticity (denoted as *lean to fat clay* or *fat clay* in the boring logs*)*. Clays that exhibit higher plasticity should be considered slightly susceptible to shrinking and swelling in response to natural moisture contents. Additional discussion regarding high plasticity clays is included in the following sections.

Representative samples of the clay and silt soils were tested for their natural moisture contents, which ranged from 22.4% to 36.4% in the analyzed specimens. In addition, Atterberg Limits were determined for a sample from TP-5 to aid in its classification. The test resulted in a classification as *silt* (ML on the boring logs). Note that a few of the clay and silt samples were also tested for their organic contents via loss-on-ignition testing. These soils were found to have LOI values ranging between 1.2% and 3.0%, indicating inorganic soils. Based on natural moisture contents, pocket penetrometer readings (q_p-values; an estimate of the unconfined compressive strength of cohesive soils) and SPT blow counts (N-values), the on-site cohesive soils should generally be considered slightly to moderately compressible.

Groundwater was not encountered in the test pits during or upon completion, however, water levels should be expected to fluctuate based on seasonal variations in precipitation, infiltration, evapotranspiration, the levels in nearby waterbodies, as well as other factors.

A more detailed description of the site soil and groundwater conditions is presented on the individual test pit logs attached in Appendix A, which also contain the laboratory test results.

According to the United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) *Web Soil Survey*, six soil series are identified within the possible development area. The predominant soil series, which constitutes approximately 65% of the site, is Durand silt loam (DwC2). Minor soils include Morley silt loam (MrC2; about 13% of the area) in the southwest and southeast portions of the site, Fox loam (FoC2; about 10% of the area) in the southeast portion of the site, Newglarus silt loam (NgD2; about 7% of the area) within the northeast portion of the site, and Terrace escarpments (Te) and Myrtle silt loam (MyB2), which make up the remaining 5% of the site. These soils were generally mapped in the eastern and northwestern portions of the site.

The site's soils are described as well-drained soils that formed from loess over loamy or silty clay loam till, fine-loamy glaciofluvial deposits over sandy and gravelly outwash, loess over clayey pedisediment derived from dolomite, and silty to fine sandy loess and/or medium to coarse textured outwash from till plains, outwash plains, ridges, and outwash terraces. A typical profile in these series involves finer-grained soils, such as silt loam, silty clay loam, clay loam, sandy clay loam, and loam at fairly shallow depths (about 0 to 5 ft), underlain by coarser-grainedfine sandy loam, stratified sand to gravel, and bedrock. According to the soil mapping, the seasonal high-water table should generally remain 80 in. or more below the ground surface across the majority of the site.

The Soil Map for this site, which was generated by the USDA-NRCS *Web Soil Survey*, is attached in Appendix E. The soil profiles in the test pits were in general agreement with the profiles from the soil mapping.

DISCUSSION AND RECOMMENDATIONS

Subject to the limitations discussed below and based on the subsurface exploration program, it is our preliminary opinion that this site is generally suitable for the planned development. However, *it must be recognized that the limited exploration program performed for this preliminary evaluation is not intended to provide sufficient detail on subsurface conditions to develop final design recommendations. A supplemental exploration via soil borings and/or supplemental test pits is recommended as design planning progresses in order to provide structure-specific geotechnical recommendations.*

In general, some excavation below subgrade (EBS or undercutting/replacement) will likely be required during development of the site, due to the prevalence of moisture sensitive clay and silt soils. More specifically, some undercutting/replacement or stabilization of marginal clay soils may be required below utilities, pavement sections, floor slabs, and/or foundations in some portions of the site, depending on final design grades. In addition, rock excavation techniques could potentially be required during site grading and/or foundation or utility construction, depending on design grades.

Preliminary recommendations for site preparation, pavement, utility, and foundation design/construction are presented in the following subsections. Additional information regarding the conclusions and recommendations presented in this report is discussed in Appendix B.

1. Site Preparation

We recommend that topsoil and vegetation be stripped at least 10 ft beyond the construction limits in areas to receive fill and where building and roadway construction is planned. The topsoil can be stockpiled on-site and later re-used as fill in landscape areas. Topsoil thicknesses typically ranged between 13 and 24 in. in the test pits, but variable topsoil thicknesses should be expected between and beyond the widespread test pit locations due to past agricultural activities.

After topsoil removal, the exposed soils are generally expected to consist of native clay soils. Granular (i.e., sand and gravel) soils and weathered bedrock in granular matrix, if exposed in areas at-grade or requiring fill should be recompacted with a vibratory smooth-drum roller, and cohesive/fine-grained (i.e., clay and silt) subgrade soils should be statically compacted (without vibration) and then proof-rolled with a piece of heavy rubber-tire construction equipment, such as a loaded scraper or tri-axle dump truck, to check for soft/yielding areas. If soft/unstable clay or silt soils are encountered, an attempt could be made to dry/recompact the cohesive and fine-grained soils to develop a stable subgrade, which will likely be the most economical alternative to improve marginal subgrade soils, but this approach will likely require more time than other alternatives and is also highly weather dependent. Several cycles of discing, drying and recompaction may be required during extended periods of favorable weather (i.e., dry, warm and windy conditions) in an effort to develop a firm subgrade. If drying/recompaction is not effective or the construction schedule or weather does not allow for drying/recompaction, the unsuitable soils can be undercut and replaced with suitable backfill compacted to at least 95% compaction based on modified Proctor methods (ASTM D1557). As an alternative, soft subgrade soils could be stabilized using coarse aggregate (e.g., 3-in. dense graded base, select crushed material, etc.) that is compacted into the subgrade until deflection ceases. Similarly, loose sands that do not improve with compaction should be undercut and replaced with suitable granular backfill. Note that the shallow clay and silt soils encountered in the test pits are considered to be moisture-sensitive, so we anticipate that some undercutting/stabilization or discing/recompacting will be required during construction, which could be fairly widespread depending on the time of the year that grading occurs. *We therefore recommend that the project budget include a generous contingency for undercutting/stabilization or discing/recompacting during site preparation (or pavement and floor slab subgrade preparation, if not addressed earlier in the project).*

After a stable subgrade has been developed, fill placement to establish site, pavement and building grades may proceed, where required. To the extent practical, we recommend using granular soils (i.e., sand and/or gravel) as fill in building areas, as well as within the upper several feet of pavement areas, as these soils are generally easier to place and compact compared to cohesive/fine-grained soils, particularly in adverse weather conditions. It is our opinion that clay and silt soils excavated on-site are best used in landscaping, or potentially in lower portions of pavement areas *assuming that moisture conditioning will be completed to facilitate proper compaction*. Moisture conditioning (drying) may require several cycles of discing and recompaction in an effort to develop adequate compaction, which could delay construction progress. The effort required to achieve proper moisture and compaction levels within clay soils should not be underestimated. Fill/backfill should be placed in accordance with the Recommended Compacted Fill Specifications presented in Appendix C. *If placement of several feet of fill will be required to establish building and/or pavement grades (i.e., more than about 5 ft above current site grades), a time delay between fill placement and beginning foundation, floor slab and pavement construction should be included to allow the slightly to moderately compressible cohesive soils generally encountered on this site to consolidate and settle under the weight of the new fill.* We can provide additional details once a site grading plan has been provided, and following completion of the recommended supplemental borings/test pits.

As noted previously, apparent harder bedrock was encountered in two of the test pits, TP-1 and TP-4, at depths of about 8 and 11 ft below the ground surface. *Due to the widely-spaced test pit locations, additional soil exploration via borings and/or supplemental test pits will be necessary to understand the approximate depth and consistency of the bedrock across the site*. Depending on site and utility grades, some rock excavation could potentially be required during construction through the use of an excavator-mounted rock chipper, blasting, etc. Rock excavation considerations are contained in Appendix D. *We recommend that a unit rate for rock excavation be established in the bidding documents and that the project budget include a generous rock excavation volume and contingency. Note that rock excavation should be clearly defined in the project specifications.*

2. Preliminary Pavement Design

The shallow cohesive soils encountered across most of the site are expected to control the pavement design, as we anticipate that the pavement subgrades (near existing site grades) will generally consist of native clay, which could potentially also be used to raised site grades in some areas. Standard earthwork-related techniques that should be used during pavement construction after topsoil stripping include proof-rolling, undercutting/stabilization (excavation below subgrade – EBS) and compaction control of fill/backfill, as discussed in the Site Preparation section of this report.

Based on the test pits, the shallow soil conditions generally appear suitable for pavement support. *However, the clay and silt soils are considered moisture-sensitive and susceptible to disturbance from repetitive construction traffic, so we recommend including a generous contingency for undercutting and stabilization with 3-in. dense graded base (or other coarse aggregate) and/or chemical stabilization in the project budget.* If long, continuous sections of soft/unstable soils are encountered, biaxial geogrid [e.g., Tensar Type 1 (BX 1100) or equivalent] or woven geotextile fabric (e.g., Mirafi 600X or equivalent) can be used in conjunction with coarse aggregate to reduce the undercut depth and provide additional stabilization. It has been our experience that clay soils with pocket penetrometer readings of less than about 1.5 tsf and/or moisture contents in excess of 25% will likely require undercutting after proof-rolling, as described above. If pavement grades will be raised above existing grade, and well-compacted granular fill is placed above a firm subgrade during general site grading, the need for undercutting/stabilization will likely be reduced.

Based on the subsurface conditions encountered in the borings and described in the soil mapping, we expect that the pavement design will be controlled by the shallow cohesive and fine-grained soils, and the following parameters may be used to develop preliminary design pavement sections, which are based on a firm or adequately stabilized subgrade being developed:

USCS Soil Classification	CL/ML
AASTHO Classification	A-4
Frost Group Index	F-3
Design Group Index	12
Soil Support Value	4.2
Subgrade Modulus, k (pci)	150

These preliminary design parameters are based on the following assumptions:

1. The subgrade has been closely monitored.
2. The subgrade has been thoroughly and adequately compacted.
3. Wet zones have been dried, drained or removed.
4. Pockets of dissimilar material have been removed, replaced or mixed to achieve a homogeneous subgrade.
5. Adequate subgrade drainage has been achieved.

(Reference: WisDOT *Geotechnical Manual)*

Assuming traffic volumes of up to 100 cars and less than 5 trucks per day per design lane [i.e., Traffic Class II according to Wisconsin Asphalt Pavement Association (WAPA) recommendations for parking lots with 50 stalls or more], a typical pavement section per WDOT Standard Specifications and following WAPA recommendations would consist of 3.5 to 4.0 in. of asphalt pavement over about 9 to 12 in. of compacted aggregate base course. In pavement areas where bus traffic is anticipated, a thicker pavement section will likely be required.

3. Utility Construction

Based on the available soil and groundwater information, it appears that utility construction can proceed using traditional open-cut methods. It is expected that excavation sidewalls will be sloped back for relatively shallow installations (i.e., less than 4 ft in depth) and that a trench shield and/or internal bracing will be used for deeper excavations. The following are our preliminary recommendations regarding trench excavation, dewatering, and backfilling:

- Excavation: Open cuts should be sloped and/or braced in accordance with OSHA guidelines. Softer clays, as well as loose silts and sands with higher fines-content (ML and SM) are generally classified as OSHA "Type C" soils, and slopes of 1.5H:1V or flatter are expected to be at least temporarily stable. At least medium stiff clays and denser silt soils are generally classified as OSHA "Type B" soils where slopes of 1H:1V are expected to be temporarily stable. Note that flatter side slopes may also be required if perched water is present that destabilizes the side slopes. *The appropriate utility trench excavation side slopes should be determined by a competent person completing the earthwork in accordance with OSHA slope guidelines.* Note that a stone stabilization layer consisting of 6 to 12 in. of compacted crushed stone may be required below the bedding layer in some areas to adequately support utility piping, depending on utility grades.

- Dewatering: Groundwater was generally not encountered in the test pits, and based on the soil mapping, seasonally high groundwater levels are anticipated to remain 80 in. or more below the ground surface across much of the site. However, depending on the location and depth of the utilities, as well as the time of year construction occurs, some dewatering may potentially be required. In general, groundwater drawdowns of less than about 1 to 2 ft can typically be achieved using submersible pumps operating from filtered sump pits, which can also be used to remove seepage or precipitation. If groundwater drawdowns exceed about 2 ft, dewatering with vacuum well points or deep wells may be required. *Dewatering means and methods are the responsibility of the utility contractor.*

- Rock Removal: Apparent weathered to fairly hard bedrock was encountered in two of the test pits, as discussed in the Subsurface Conditions section. The soil mapping indicates that bedrock could be present at depths as shallow as 3 to 4 ft below the ground surface in some areas; therefore, some bedrock excavation should generally be expected during utility construction, depending on design grades. Supplemental exploration in the form of soil borings and possibly test pits is recommended to further explore the subsurface conditions on this site, as bedrock is commonly encountered throughout Monroe and the surrounding area. Larger cobbles or boulders encountered in narrow utility trenches may also hinder and slow excavation.

- Backfilling: Excavation backfilling may proceed using the following guidelines:

  - Although clayey and silty excavation spoils may be used to backfill the utility trenches above the pipe and associated granular bedding material, to the extent possible, we recommend that granular soils be used as backfill below paved areas because sand/gravel soils are relatively easy to place and compact in most weather conditions compared to cohesive soils. Silt and clay soils will likely require moisture conditioning prior to placement and compaction, which could delay construction progress. Granular soils containing cobbles and boulders should not be used in direct contact with utility lines.

- Backfill material should be placed in accordance with Appendix C guidelines or applicable municipal requirements.

- Compaction recommendations:

  - Within 10 ft of buildings: 95% modified Proctor (ASTM D1557);
  - Depths greater than 3 ft below grade in pavement areas: 90% modified Proctor;
  - Final 3 ft in pavement areas: 95% modified Proctor; and
  - Landscape areas: 85% modified Proctor.

4. Preliminary Foundation Design

Based on a preliminary finished floor elevation of EL 1075 ft for the building, we anticipate fairly hard to weathered bedrock, clay or silt soils to be encountered at foundation grades. If site grades are raised, footings could potentially bear on compacted structural fill, in which case it is important that the existing soils be carefully checked to document the existing soils are suitable for building support prior to new fill placement. As stated previously, *additional exploration via soil borings and/or test pits should be conducted to further characterize the subsurface conditions across the site.*

It is our preliminary opinion that the planned school can likely be supported on a conventional spread footing foundation system bearing on suitable soils or bedrock, with the understanding that *depending on building location and grades, some undercutting below footings (and floor slabs) due to marginal soils, as well as some rock excavation, should generally be expected.*

The following parameters should be used for *preliminary* foundation design:

- Maximum net allowable bearing pressure: 3,000 psf

- Minimum foundation widths:
  - Continuous wall footings: 18 in.
  - Column pad footings: 30 in.

- Minimum footing depths:
  - Exterior/perimeter footings: 4 ft
  - Interior footings: no minimum requirement

Undercutting will generally be required where loose or disturbed sand/silt soils or clay with q_P-readings of less than 1.5 tsf are encountered at or slightly below the bottom of footings designed for an allowable bearing pressure of 3,000 psf. Where undercutting is required, the base of the undercut excavation should be widened beyond the footing edges at least 0.5 ft in each direction for each foot of undercut depth for stress distribution purposes. Foundation grades can be restored with granular backfill compacted to at least 95% compaction (modified Proctor – ASTM D1557) or 3-in. dense graded base that is placed in maximum loose lifts of 12 in. and thoroughly compacted with a large vibratory compactor until deflection ceases. As an alternative, a lean concrete mix (1,000 psi or more) could also be used to backfill overexcavations below planned footings.

Since the subsurface conditions will vary across the site, CGC should be present during footing excavations to check whether subgrades are satisfactory for the design bearing pressure and to advise on corrective measures, where necessary. We recommend using a smooth-edged backhoe bucket for footing and undercut excavations in soil. A bucket with teeth is acceptable if excavation occurs in weathered bedrock, provided loosened rock is removed from the bottom of the excavation. Additionally, granular soils exposed at footing grade or at the bottom of undercut excavations that are not susceptible to disturbance from vibrations should be recompacted with a large vibratory plate compactor or an excavator-mounted hoe-pack prior to formwork/concrete placement to densify soils loosened during the excavation process. Soils potentially susceptible to disturbance from compaction (e.g., *silty or clayey soils* or granular soils with elevated moisture contents) should be hand trimmed and/or stabilized with clear stone, as appropriate.

5. Shrink/Swell Considerations

As discussed previously, the high plasticity (fat) clays present within portions of this site are considered susceptible to shrinking and swelling in response to moisture changes. Depending on final building grades, these soils could remain below foundation elements, portions of the pavement areas, and may be used as fill/backfill in building and pavement areas across the site. In general, as a precaution against the potential for shrink/well of these clays, it is important that exterior grades be sloped to provide positive drainage away from buildings or structures. Roof drains should discharge into a storm sewer or stormwater management system that is located a sufficient distance away from the building such that water does not migrate back towards the building. In addition, rapidly growing trees or other vegetation with deep roots should not be planted in close proximity to the building. Should footing grades be established within high-plasticity clay, the subgrades should be protected against moisture fluctuations between the time of exposure and footing concrete placement to prevent the potential for post-construction settlement as a result of swelling and shrinking.

CONSTRUCTION CONSIDERATIONS

Due to variations in weather, construction methods and other factors, specific construction problems are difficult to predict. Soil related difficulties that could be encountered on the site are discussed below:

- Earthwork construction during the late fall through early spring could be complicated as a result of wet weather and freezing temperatures. During cold weather, exposed subgrades should be protected from freezing before and after footing construction. Fill should never be placed while frozen or on frozen ground.

- If the construction schedule requires that construction proceed during adverse weather, typically encountered during fall through spring, the contingency for undercutting disturbed soils should be increased.

- To the extent practical, traffic should be avoided on prepared subgrades to minimize further disturbance.

- Excavations extending greater than 4 ft in depth below the existing ground surface should be sloped or braced in accordance with current OSHA standards.

- Based on the performed test pits and the USDA-NRCS soil mapping for the site, groundwater infiltration into utility and footing excavations is generally not anticipated, but could occur depending on final structure locations and grades, as well as the time of year construction occurs. Water present in excavations as a result of precipitation or seepage (e.g., from perched water on top of fairly hard/impermeable bedrock) should be removed, as previously discussed, by means and methods evaluated by the contractor.

- The depth to bedrock is expected to vary across the site. Potential bedrock removal could be necessary during foundation excavations, or during utility construction. Supplemental soil borings and/or test pits should be performed to determine if/where bedrock excavation may be necessary. See the Utility Construction section of the report, as well as Appendix D for additional information regarding rock excavation.

RECOMMENDED CONSTRUCTION MONITORING

The quality of the foundation, slab and pavement subgrades will largely be determined by the level of care exercised during site development. To check that earthwork and foundation construction proceeds in accordance with our recommendations, the following operations should be monitored by CGC:

- Topsoil stripping/removal and subgrade proof-rolling;
- Fill/backfill placement and compaction;
- Foundation excavation and subgrade preparation; and
- Concrete placement.

FOLLOW-UP EXPLORATION PROGRAMS

The exploration program described in this report is preliminary in nature and is not intended to provide sufficient detail on subsurface conditions for the entire school campus. Due to the variability in subsurface conditions, follow-up exploration by soil borings and/or supplemental test pits is recommended to provide structure-specific geotechnical recommendations. We can provide specific recommendations and a proposal for the additional geotechnical work at the appropriate time.

* * * * *

It has been a pleasure to serve you on this project. If you have any questions or need additional consultation, please contact us.

Sincerely,

CGC, Inc.

Emma Carew

Emma L. Carew, E.I.T
Staff Engineer

Tim F. Gassenheimer, P.E., CST
Senior Staff Engineer

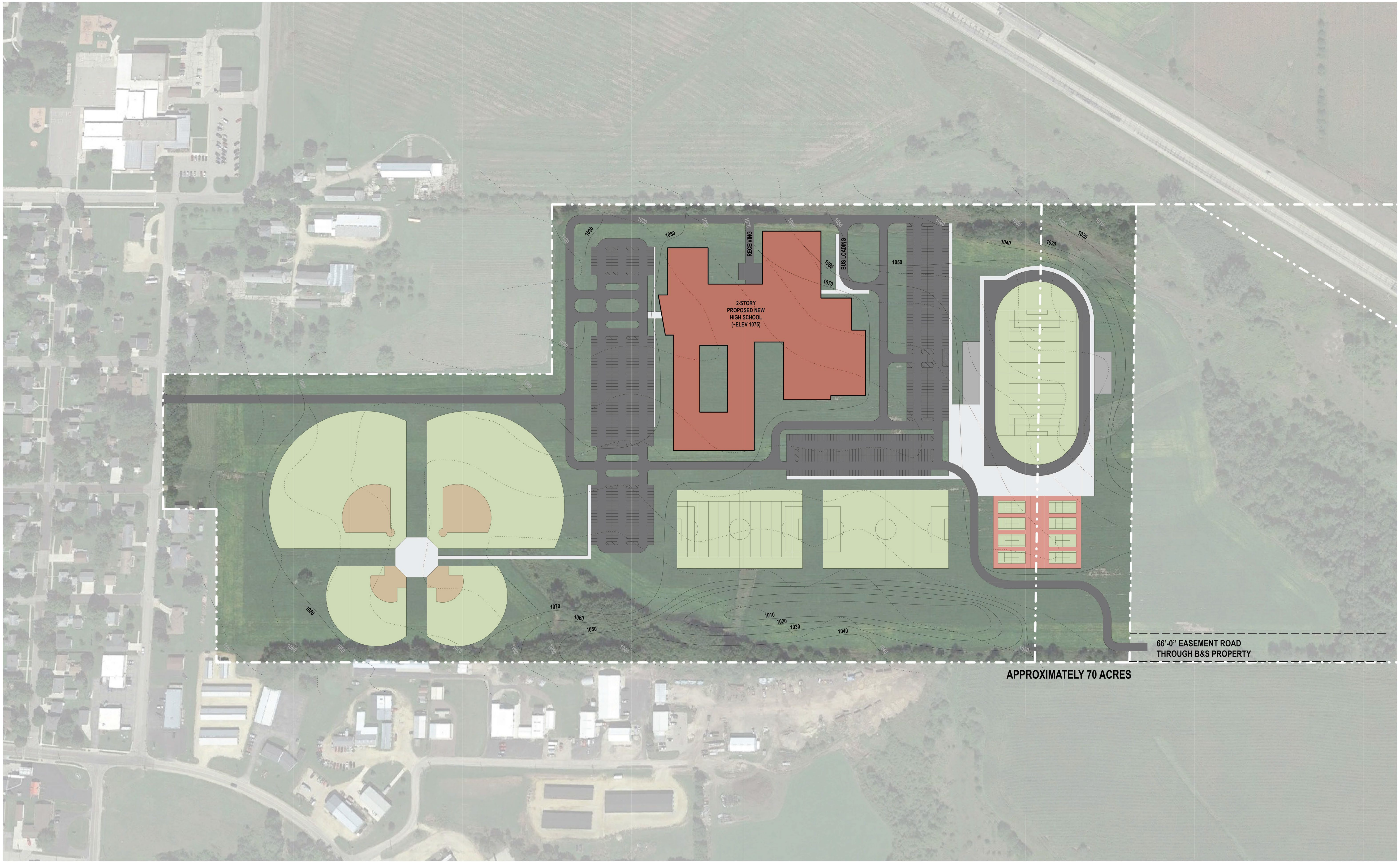
Encl:

- Appendix A - Test Pit Location Exhibit
  - Logs of Test Pits (5)
  - Log of Test Boring-General Notes
  - Unified Soil Classification System
- Appendix B - Document Qualifications
- Appendix C - Recommended Compacted Fill Specifications
- Appendix D - Rock Excavation Considerations
- Appendix E - USDA-NRCS *Web Soil Survey* – Map and Legend

APPENDIX A

TEST PIT LOCATION EXHIBIT
LOGS OF TEST PITS (5)
LOG OF TEST BORING-GENERAL NOTES
UNIFIED SOIL CLASSIFICATION SYSTEM

PLUNKETT RAYSICH ARCHITECTS, LLP



LOG OF TEST PIT

CGC Inc.

Project: **Monroe High School Preliminary Exploration**
Location: **31st Avenue, Monroe, WI**

Pit No. **1**
Surface Elevation **1059.6**
Job No. **C23315**
Sheet **1** of **1**

2921 PERRY STREET, MADISON, WIS. 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	Probe (in.)
						16 ± in. TOPSOIL					
1			M			Very Stiff, Brown Lean CLAY, Trace Sand and Gravel (CL)	(2.0-2.5)	23.8			
2			M			Orange-Brown Fine SAND, Some Silt and Gravel, Scattered Cobbles (SM; Probable Weathered Bedrock) Increasing Gravel Content with Depth.					
						End of Test Pit at 8 ft Due to Presence of Apparent Harder Bedrock					
						Backfilled with Spoils and Tamped with Excavator Bucket					

Depth scale (ft): 5, 10, 15, 20, 25, 30, 35, 40

WATER LEVEL OBSERVATIONS

While Excavating	NW	Upon Completion of Drilling		NW
Time After Excavating				
Depth to Water				NW
Depth to Cave in				

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start	7/12/23	End	7/12/23
Driller	ME	Chief	Josh
Logger	ELC	Editor	ELC
Equip. Used:	SK 330		

Kobelco Excavator

LOG OF TEST PIT

CGC Inc.

Project	Monroe High School Preliminary Exploration
Location	31st Avenue, Monroe, WI
Pit No.	2
Surface Elevation	1098.3
Job No.	C23315
Sheet	1 of 1

2921 PERRY STREET, MADISON, WIS. 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE / VISUAL CLASSIFICATION and Remarks / SOIL PROPERTIES

No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	Visual Classification and Remarks	qu (qa) (tsf)	W	LL	PL	Probe (in.)
						18 ± in. TOPSOIL					
1			M			Very Stiff, Brown Lean CLAY, Trace Sand and Gravel (CL)	(2.5-3.0)	22.6			
2			M			Very Stiff, Reddish Brown Lean to Fat CLAY, Trace Sand, Trace to Little Gravel (CL-CH) *LOI: 3.0%* *Sandier with Depth.*	(3.0-4.0)	22.4			
3			M		5	Brownish Gray SILT, Trace Clay, Trace to Little Sand, Trace Gravel (ML) *LOI: 1.3%* *Increasing Gravel Content with Depth.*		23.2			
					15	End of Test Pit at 15 ft. Backfilled with Spoils and Tamped with Excavator Bucket					

WATER LEVEL OBSERVATIONS

While Excavating	NW	Upon Completion of Drilling		NW
Time After Excavating				
Depth to Water				NW
Depth to Cave in				

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start	7/12/23	End	7/12/23
Driller	ME	Chief	Josh
Logger	ELC	Editor	ELC
Equip. Used:	SK 330		

Kobelco Excavator

CGC Inc.

LOG OF TEST PIT

Project: **Monroe High School**
Preliminary Exploration
Location: **31st Avenue, Monroe, WI**

Pit No. **3**
Surface Elevation **1077.8**
Job No. **C23315**
Sheet **1** of **1**

2921 PERRY STREET, MADISON, WIS. 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	Probe (in.)
						13 ± in. TOPSOIL					
1			M			Very Stiff, Brown Lean CLAY, Trace Sand and Gravel (CL)	(3.0)				
2			M				(3.0-4.0+)				
					5	Very Stiff to Hard, Reddish Brown Lean to Fat CLAY, Little Gravel (CL/CH)		36.4			
3			M		10	Very Stiff to Hard, Red Fat CLAY, Some Gravel, Scattered Cobbles (CH; Probable Highly Weathered Dolomitic Bedrock)	(3.0-4.0+)				
					15	End of Test Pit at 15 ft Backfilled with Spoils and Tamped with Excavator Bucket					
					20						
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS

While Excavating ∇ NW   Upon Completion of Drilling NW
Time After Excavating
Depth to Water NW
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start 7/12/23 End 7/12/23
Driller ME Chief Josh . Kobelco
Logger ELC Editor ELC Excavator
Equip. Used: SK 330

LOG OF TEST PIT

CGC Inc.

Project	Monroe High School
	Preliminary Exploration
Location	31st Avenue, Monroe, WI

Pit No.	4
Surface Elevation	1063.6
Job No.	C23315
Sheet	1 of 1

2921 PERRY STREET, MADISON, WIS. 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	qu (qa) (tsf)	W	LL	PL	Probe (in.)
						18 ± in. TOPSOIL					
1			M			Stiff to Very Stiff, Brown Lean CLAY, Trace Sand and Gravel (CL)	(2.0-3.0)	32.9			
					5	Brown/Orange Mottling at 3.8 ft Depth.	(1.5-2.0)				
2			M			Increasing Sand and Gravel Contents and Occasional Cobbles with Depth.	(4.0+)				
3			M		10	Very Stiff to Hard, Reddish Brown Fat CLAY, Some Gravel, Scattered Cobbles (CH; Probable Highly Weathered Dolomitic Bedrock)					
						Orange-Brown Fine SAND, Some Silt and Gravel, Scattered Cobbles (SM; Probable Weathered Bedrock)					
					15	End of Test Pit at 11 ft Due to Presence of Apparent Harder Bedrock					
						Backfilled with Spoils and Tamped with Excavator Bucket					
					20						
					25						
					30						
					35						
					40						

WATER LEVEL OBSERVATIONS

While Excavating	▽ NW	Upon Completion of Drilling		NW
Time After Excavating				
Depth to Water				NW ▼
Depth to Cave in				

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start	7/12/23	End	7/12/23	
Driller	ME	Chief	Josh	Kobelco
Logger	ELC	Editor	ELC	Excavator
Equip. Used:	SK 330			

CGC Inc.

LOG OF TEST PIT

Project: **Monroe High School**
Preliminary Exploration
Location: **31st Avenue, Monroe, WI**

Pit No. **5**
Surface Elevation **1034.1**
Job No. **C23315**
Sheet **1** of **1**

2921 PERRY STREET, MADISON, WIS. 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	Probe (in.)
						24 ± in. TOPSOIL					
1			M			Very Stiff, Brown Lean CLAY, Trace Sand and Gravel (CL)	(2.5-3.0)	27.5			
					5			25.8	30	24	
								37.7			
2			M		10	Brown/Orange (Mottled) SILT, Trace Clay, Trace to Little Sand, Trace Gravel (ML) *LOI: 1.2%*					
3			M		15	Stiff, Reddish Brown Lean to Fat CLAY, Some Gravel, Scattered Cobbles (CL/CH) *LOI: 2.4%*	(1.5)				
						End of Test Pit at 15 ft Backfilled with Spoils and Tamped with Excavator Bucket					

WATER LEVEL OBSERVATIONS

While Excavating	NW	Upon Completion of Drilling		NW
Time After Excavating				
Depth to Water				NW
Depth to Cave in				

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start	7/12/23	End	7/12/23
Driller	ME	Chief	Josh
Logger	ELC	Editor	ELC
Equip. Used:	SK 330		

Kobelco Excavator

CGC, Inc.

LOG OF TEST BORING

General Notes

DESCRIPTIVE SOIL CLASSIFICATION

Grain Size Terminology

Soil Fraction	Particle Size	U.S. Standard Sieve Size
Boulders	Larger than 12”	Larger than 12”
Cobbles	3” to 12”	3” to 12”
Gravel: Coarse	¾” to 3”	¾” to 3”
Fine	4.76 mm to ¾”	#4 to ¾”
Sand: Coarse	2.00 mm to 4.76 mm	#10 to #4
Medium	0.42 to mm to 2.00 mm	#40 to #10
Fine	0.074 mm to 0.42 mm	#200 to #40
Silt	0.005 mm to 0.074 mm	Smaller than #200
Clay	Smaller than 0.005 mm	Smaller than #200

Plasticity characteristics differentiate between silt and clay.

General Terminology

Physical Characteristics
Color, moisture, grain shape, fineness, etc.
Major Constituents
Clay, silt, sand, gravel
Structure
Laminated, varved, fibrous, stratified, cemented, fissured, etc.
Geologic Origin
Glacial, alluvial, eolian, residual, etc.

Relative Density

Term	“N” Value
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Over 50

Relative Proportions Of Cohesionless Soils

Proportional Term	Defining Range by Percentage of Weight
Trace	0% - 5%
Little	5% - 12%
Some	12% - 35%
And	35% - 50%

Consistency

Term	q_u-tons/sq. ft
Very Soft	0.0 to 0.25
Soft	0.25 to 0.50
Medium	0.50 to 1.0
Stiff	1.0 to 2.0
Very Stiff	2.0 to 4.0
Hard	Over 4.0

Organic Content by Combustion Method

Soil Description	Loss on Ignition
Non Organic	Less than 4%
Organic Silt/Clay	4 – 12%
Sedimentary Peat	12% - 50%
Fibrous and Woody Peat	More than 50%

Plasticity

Term	Plastic Index
None to Slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to Very High	Over 22

The penetration resistance, N, is the summation of the number of blows required to effect two successive 6” penetrations of the 2” split-barrel sampler. The sampler is driven with a 140 lb. weight falling 30” and is seated to a depth of 6” before commencing the standard penetration test.

SYMBOLS

Drilling and Sampling

CS – Continuous Sampling
RC – Rock Coring: Size AW, BW, NW, 2”W
RQD – Rock Quality Designation
RB – Rock Bit/Roller Bit
FT – Fish Tail
DC – Drove Casing
C – Casing: Size 2 ½”, NW, 4”, HW
CW – Clear Water
DM – Drilling Mud
HSA – Hollow Stem Auger
FA – Flight Auger
HA – Hand Auger
COA – Clean-Out Auger
SS - 2” Dia. Split-Barrel Sample
2ST – 2” Dia. Thin-Walled Tube Sample
3ST – 3” Dia. Thin-Walled Tube Sample
PT – 3” Dia. Piston Tube Sample
AS – Auger Sample
WS – Wash Sample
PTS – Peat Sample
PS – Pitcher Sample
NR – No Recovery
S – Sounding
PMT – Borehole Pressuremeter Test
VS – Vane Shear Test
WPT – Water Pressure Test

Laboratory Tests

q_a – Penetrometer Reading, tons/sq ft
q_a – Unconfined Strength, tons/sq ft
W – Moisture Content, %
LL – Liquid Limit, %
PL – Plastic Limit, %
SL – Shrinkage Limit, %
LI – Loss on Ignition
D – Dry Unit Weight, lbs/cu ft
pH – Measure of Soil Alkalinity or Acidity
FS – Free Swell, %

Water Level Measurement

▽ - Water Level at Time Shown
NW – No Water Encountered
WD – While Drilling
BCR – Before Casing Removal
ACR – After Casing Removal
CW – Cave and Wet
CM – Caved and Moist

Note: Water level measurements shown on the boring logs represent conditions at the time indicated and may not reflect static levels, especially in cohesive soils.

CGC, Inc.

Madison - Milwaukee

Unified Soil Classification System

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

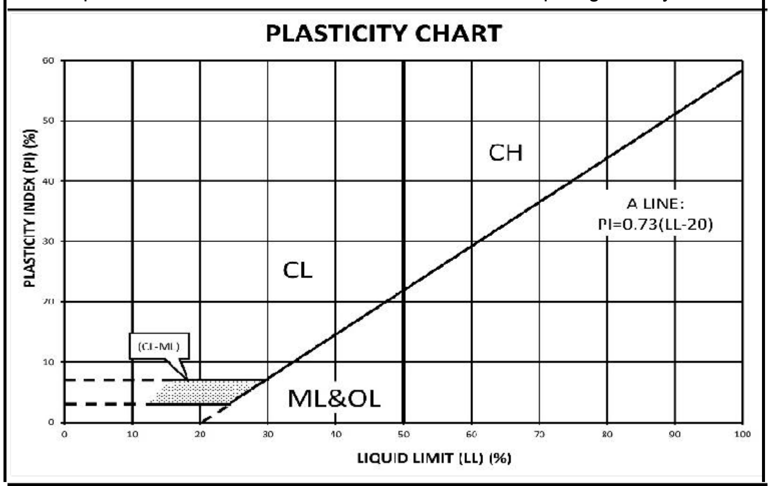
COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size)		
	Clean Gravels (Less than 5% fines)	
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	
	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
	Clean Sands (Less than 5% fines)	
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	SW	Well-graded sands, gravelly sands, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	
	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)		
SILTS AND CLAYS Liquid limit less than 50%	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils

LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limts below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limts above "A" line or P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent....................GW, GP, SW, SP
More than 12 percent....................GM, GC, SM, SC
5 to 12 percent .... Borderline cases requiring dual symbols



APPENDIX B

DOCUMENT QUALIFICATIONS

APPENDIX B
DOCUMENT QUALIFICATIONS

I. GENERAL RECOMMENDATIONS/LIMITATIONS

CGC, Inc. should be provided the opportunity for a general review of the final design and specifications to confirm that earthwork and foundation requirements have been properly interpreted in the design and specifications. CGC should be retained to provide soil engineering services during excavation and subgrade preparation. This will allow us to observe that construction proceeds in compliance with the design concepts, specifications and recommendations, and also will allow design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction. CGC does not assume responsibility for compliance with the recommendations in this report unless we are retained to provide construction testing and observation services.

This report has been prepared in accordance with generally accepted soil and foundation engineering practices and no other warranties are expressed or implied. The opinions and recommendations submitted in this report are based on interpretation of the subsurface information revealed by the test borings indicated on the location plan. The report does not reflect potential variations in subsurface conditions between or beyond these borings. Therefore, variations in soil conditions can be expected between the boring locations and fluctuations of groundwater levels may occur with time. The nature and extent of the variations may not become evident until construction.

II. IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes. While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. *No one except you* should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

READ THE FULL REPORT

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *CGC cannot accept responsibility or liability for problems that occur because our reports do not consider developments of which we were not informed.*

SUBSURFACE CONDITIONS CAN CHANGE

A geotechnical engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

MOST GEOTECHNICAL FINDINGS ARE PROFESSIONAL OPINION

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgement to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ - sometimes significantly - from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A REPORT'S RECOMMENDATIONS ARE NOT FINAL

Do not over-rely on the confirmation-dependent recommendations included in your report. *Those confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgement and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *CGC cannot assume responsibility or liability for the report's confirmation-dependent recommendations if we do not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical engineering report. Confront that risk by having CGC participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

DO NOT REDRAW THE ENGINEER'S LOGS

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

GIVE CONSTRUCTORS A COMPLETE REPORT AND GUIDANCE

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

READ RESPONSIBILITY PROVISIONS CLOSELY

Some clients, design professionals, and constructors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineer's responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

ENVIRONMENTAL CONCERNS ARE NOT COVERED

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

OBTAIN PROFESSIONAL ASSISTANCE TO DEAL WITH MOLD

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

RELY ON YOUR GEOTECHNICAL ENGINEER FOR ADDITIONAL ASSISTANCE

Membership in the Geotechnical Business Council (GBC) of Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with CGC, a member of GBC, for more information.

Modified and reprinted with permission from:

Geotechnical Business Council
of the Geoprofessional Business Association
8811 Colesville Road, Suite G 106
Silver Spring, MD 20910

APPENDIX C

RECOMMENDED COMPACTED FILL SPECIFICATIONS

APPENDIX C

CGC, INC.

RECOMMENDED COMPACTED FILL SPECIFICATIONS

General Fill Materials

Proposed fill shall contain no vegetation, roots, topsoil, peat, ash, wood or any other non-soil material which by decomposition might cause settlement. Also, fill shall never be placed while frozen or on frozen surfaces. Rock, stone or broken concrete greater than 6 in. in the largest dimension shall not be placed within 10 ft of the building area. Fill used greater than 10 ft beyond the building limits shall not contain rock, boulders or concrete pieces greater than a 2 sq ft area and shall not be placed within the final 2 ft of finish subgrade or in designated utility construction areas. Fill containing rock, boulders or concrete pieces should include sufficient finer material to fill voids among the larger fragments.

Special Fill Materials

In certain cases, special fill materials may be required for specific purposes, such as stabilizing subgrades, backfilling undercut excavations or filling behind retaining walls. For reference, WisDOT gradation specifications for various types of granular fill are attached in Table 1.

Placement Method

The approved fill shall be placed, spread and leveled in layers generally not exceeding 10 in. in thickness before compaction. The fill shall be placed at moisture content capable of achieving the desired compaction level. For clay soils or granular soils containing an appreciable amount of cohesive fines, moisture conditioning will likely be required.

It is the Contractor's responsibility to provide all necessary compaction equipment and other grading equipment that may be required to attain the specified compaction. Hand-guided vibratory or tamping compactors will be required whenever fill is placed adjacent to walls, footings, columns or in confined areas.

Compaction Specifications

Maximum dry density and optimum moisture content of the fill soil shall be determined in accordance with modified Proctor methods (ASTM D1557). The recommended field compaction as a percentage of the maximum dry density is shown in Table 2. Note that these compaction guidelines would generally not apply to coarse gravel/stone fill. Instead, a method specification would apply (e.g., compact in thin lifts with a vibratory compactor until no further consolidation is evident).

Testing Procedures

Representative samples of proposed fill shall be submitted to CGC, Inc. for optimum moisture-maximum density determination (ASTM D1557) prior to the start of fill placement. The sample size should be approximately 50 lb.

CGC, Inc. shall be retained to perform field density tests to determine the level of compaction being achieved in the fill. The tests shall generally be conducted on each lift at the beginning of fill placement and at a frequency mutually agreed upon by the project team for the remainder of the project.

Table 1
Gradation of Special Fill Materials

Material	WisDOT Section 311	WisDOT Section 312	WisDOT Section 305			WisDOT Section 209		WisDOT Section 210
	Breaker Run	Select Crushed Material	3-in. Dense Graded Base	1 1/4-in. Dense Graded Base	3/4-in. Dense Graded Base	Grade 1 Granular Backfill	Grade 2 Granular Backfill	Structure Backfill
Sieve Size	Percent Passing by Weight							
6 in.	100							
5 in.		90-100						
3 in.			90-100					100
1 1/2 in.		20-50	60-85					
1 1/4 in.				95-100				
1 in.					100			
3/4 in.			40-65	70-93	95-100			
3/8 in.				42-80	50-90			
No. 4			15-40	25-63	35-70	100 (2)	100 (2)	25-100
No. 10		0-10	10-30	16-48	15-55			
No. 40			5-20	8-28	10-35	75 (2)		
No. 100						15 (2)	30 (2)	
No. 200			2-12	2-12	5-15	8 (2)	15 (2)	15 (2)

Notes:
1. Reference: Wisconsin Department of Transportation *Standard Specifications for Highway and Structure Construction.*
2. Percentage applies to the material passing the No. 4 sieve, not the entire sample.
3. Per WisDOT specifications, both breaker run and select crushed material can include concrete that is 'substantially free of steel, building materials and other deleterious material'.

Table 2
Compaction Guidelines

Area	Percent Compaction (1) Clay/Silt	Percent Compaction (1) Sand/Gravel
Within 10 ft of building lines		
Footing bearing soils	93 - 95	95
Under floors, steps and walks		
- Lightly loaded floor slab	90	90
- Heavily loaded floor slab and thicker fill zones	92	95
Beyond 10 ft of building lines		
Under walks and pavements		
- Less than 2 ft below subgrade	92	95
- Greater than 2 ft below subgrade	90	90
Landscaping	85	90

Notes:
1. Based on Modified Proctor Dry Density (ASTM D 1557)

APPENDIX D

ROCK EXCAVATION CONSIDERATIONS

APPENDIX D

CGC, INC.

RECOMMENDED COMPACTED FILL SPECIFICATIONS

General Fill Materials

Proposed fill shall contain no vegetation, roots, topsoil, peat, ash, wood or any other non-soil material which by decomposition might cause settlement. Also, fill shall never be placed while frozen or on frozen surfaces. Rock, stone or broken concrete greater than 6 in. in the largest dimension shall not be placed within 10 ft of the building area. Fill used greater than 10 ft beyond the building limits shall not contain rock, boulders or concrete pieces greater than a 2 sq ft area and shall not be placed within the final 2 ft of finish subgrade or in designated utility construction areas. Fill containing rock, boulders or concrete pieces should include sufficient finer material to fill voids among the larger fragments.

Special Fill Materials

In certain cases, special fill materials may be required for specific purposes, such as stabilizing subgrades, backfilling undercut excavations or filling behind retaining walls. For reference, WisDOT gradation specifications for various types of granular fill are attached in Table 1.

Placement Method

The approved fill shall be placed, spread and leveled in layers generally not exceeding 10 in. in thickness before compaction. The fill shall be placed at moisture content capable of achieving the desired compaction level. For clay soils or granular soils containing an appreciable amount of cohesive fines, moisture conditioning will likely be required.

It is the Contractor's responsibility to provide all necessary compaction equipment and other grading equipment that may be required to attain the specified compaction. Hand-guided vibratory or tamping compactors will be required whenever fill is placed adjacent to walls, footings, columns or in confined areas.

Compaction Specifications

Maximum dry density and optimum moisture content of the fill soil shall be determined in accordance with modified Proctor methods (ASTM D1557). The recommended field compaction as a percentage of the maximum dry density is shown in Table 2. Note that these compaction guidelines would generally not apply to coarse gravel/stone fill. Instead, a method specification would apply (e.g., compact in thin lifts with a vibratory compactor until no further consolidation is evident).

Testing Procedures

Representative samples of proposed fill shall be submitted to CGC, Inc. for optimum moisture-maximum density determination (ASTM D1557) prior to the start of fill placement. The sample size should be approximately 50 lb.

CGC, Inc. shall be retained to perform field density tests to determine the level of compaction being achieved in the fill. The tests shall generally be conducted on each lift at the beginning of fill placement and at a frequency mutually agreed upon by the project team for the remainder of the project.

Table 1
Gradation of Special Fill Materials

Material	WisDOT Section 311	WisDOT Section 312	WisDOT Section 305			WisDOT Section 209		WisDOT Section 210
	Breaker Run	Select Crushed Material	3-in. Dense Graded Base	1 1/4-in. Dense Graded Base	3/4-in. Dense Graded Base	Grade 1 Granular Backfill	Grade 2 Granular Backfill	Structure Backfill
Sieve Size	Percent Passing by Weight							
6 in.	100							
5 in.		90-100						
3 in.			90-100					100
1 1/2 in.		20-50	60-85					
1 1/4 in.				95-100				
1 in.					100			
3/4 in.			40-65	70-93	95-100			
3/8 in.				42-80	50-90			
No. 4			15-40	25-63	35-70	100 (2)	100 (2)	25-100
No. 10		0-10	10-30	16-48	15-55			
No. 40			5-20	8-28	10-35	75 (2)		
No. 100						15 (2)	30 (2)	
No. 200			2-12	2-12	5-15	8 (2)	15 (2)	15 (2)

Notes:

1. Reference: Wisconsin Department of Transportation *Standard Specifications for Highway and Structure Construction.*
2. Percentage applies to the material passing the No. 4 sieve, not the entire sample.
3. Per WisDOT specifications, both breaker run and select crushed material can include concrete that is 'substantially free of steel, building materials and other deleterious material'.

Table 2
Compaction Guidelines

Area	Percent Compaction (1) Clay/Silt	Percent Compaction (1) Sand/Gravel
Within 10 ft of building lines		
Footing bearing soils	93 - 95	95
Under floors, steps and walks		
- Lightly loaded floor slab	90	90
- Heavily loaded floor slab and thicker fill zones	92	95
Beyond 10 ft of building lines		
Under walks and pavements		
- Less than 2 ft below subgrade	92	95
- Greater than 2 ft below subgrade	90	90
Landscaping	85	90

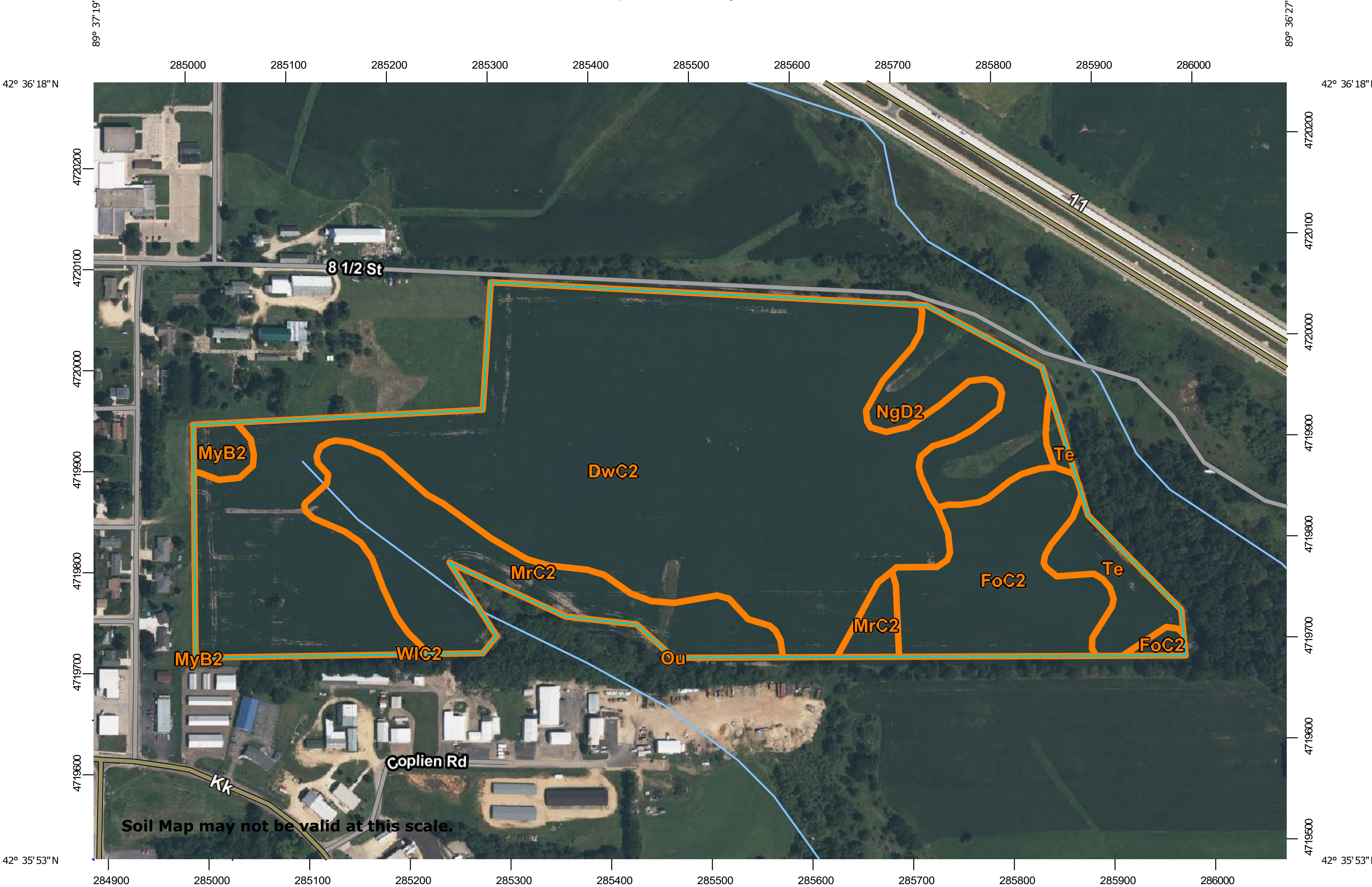
Notes:

1. Based on Modified Proctor Dry Density (ASTM D 1557)

APPENDIX E

UNITED STATES DEPARTMENT OF AGRICULTURE – NATURAL RESOURCES CONSERVATION SERVICE *WEB SOIL SURVEY* MAP AND LEGEND

Soil Map—Green County, Wisconsin



Map Scale: 1:5,420 if printed on A landscape (11" x 8.5") sheet.

0 50 100 200 300

Feet

0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Green County, Wisconsin
Survey Area Data: Version 23, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 12, 2020—Aug 14, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DwC2	Durand silt loam, 6 to 12 percent slopes, moderately eroded	43.7	64.7%
FoC2	Fox loam, 6 to 12 percent slopes, eroded	7.0	10.4%
MrC2	Morley silt loam, 6 to 12 percent slopes, moderately eroded	9.0	13.3%
MyB2	Myrtle silt loam, 2 to 6 percent slopes, moderately eroded	0.7	1.1%
NgD2	Newglarus silt loam, moderately deep, 12 to 20 percent slopes, moderately eroded	4.7	7.0%
Ou	Otter silt loam, frequently flooded	0.0	0.0%
Te	Terrace escarpments	2.4	3.5%
WlC2	Whalan silt loam, 6 to 12 percent slopes, moderately eroded	0.0	0.0%
Totals for Area of Interest		**67.5**	**100.0%**